

Magnetism

2-5 The student will demonstrate an understanding of force and motion by applying the properties of magnetism. (Physical Science)
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2.5.1 Use magnets to make an object move without being touched.

Taxonomy level: 3.2-A Apply Factual Knowledge

Previous/Future knowledge: Students will build upon this foundation knowledge in 4th (4-5.9) when they summarize the properties of magnets and electromagnets (including polarity, attraction/repulsion, and strength).

It is essential for students to know that magnets can make an object move without touching the object. Other properties of magnets are:

- A magnet is solid material that attracts iron or products that contain iron like steel.
- A magnet can pull objects if the object contains iron.
- The magnet pulls the object using its *magnetic force*. This magnetic force cannot be seen but it can be observed when the magnet moves the object without touching it.

It is not essential for students to know about electromagnets at this grade level.

Assessment Guidelines:

The objective of this indicator is to *use* magnets to make objects move without being touched; therefore, the primary focus of assessment should be to apply a procedure to magnets to make them move objects without being touched. However, appropriate assessments should also require students to *identify* magnets; or *explain* how a magnet can move objects without touching them.

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2-5.2 Explain how the poles of magnets affect each other (that is, they attract and repel one another).

Taxonomy level: 2.7-B Understand Conceptual Knowledge

Previous/Future knowledge: In kindergarten (K-5.1), students classified objects observable properties including magnetic attraction. This concept will be further developed in 4th grade (4-5.9) when they summarize the properties of magnets and electromagnets (including polarity, attraction/repulsion, and strength).

It is essential for students to know that a magnet has two poles; one on each end.

- These poles are called the North pole (N) or the South pole (S).
- If the poles that are alike (North to North or South to South) are put together, they repel or push away.
- If the poles that are different (North to South or South to North) are put together, they attract or stick together.
- Some magnets, for example ring magnets, do not have the (N) or the (S) marked on them but they do have two poles that are either located on the top or bottom of the magnet.
- The poles can be determined by placing the magnets together.
- If they stay together then the poles are opposite but if they push away from each other the poles are alike.

It is not essential for students to learn about electromagnets at this grade level.

Assessment Guidelines:

The objective of this indicator is to *explain* the effects magnets have on each other; therefore, the primary focus of assessment should be to construct a cause-and-effect model of the effects magnets have on each other. However, appropriate assessments should also require students to *recall* that magnets have two poles and opposite poles attract where like poles repel.

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2.5.3 Compare the effect of magnets on various materials.

Taxonomy level: 2.6-B Understand Conceptual Knowledge

Previous/Future knowledge: In kindergarten (K-5.1), students classified objects observable properties including magnetic attraction. This concept will be further developed in 4th grade (4-5.9) when they summarize the properties of magnets and electromagnets (including polarity, attraction/repulsion, and strength).

It is essential for students to know the effect of magnets on various materials.

- A magnet is solid material that attracts iron or products that contain iron like steel.
- If a material does not have iron in its composition, the magnet will not attract it.

NOTE TO TEACHER: A possible misconception can be formed if students do not realize some objects that look like metal do not contain iron, therefore they do not have magnetic properties, and they will not be attracted to a magnet.

SAFETY NOTE TO TEACHER: The effect of magnets on various materials is a very important classroom safety issue. Students need to know that they should not use magnets around computers, computer disks, TVs, VCRs, tape recorders, videotapes, or cassette tapes. Continual use of magnets around these materials will cause them to not work properly or their contents will be erased.

It is not essential for students to know that cobalt and nickel also have magnetic properties.

Assessment Guidelines:

The objective of this indicator is to *compare* the effect of magnets on various materials; therefore, the primary focus of assessment should be to detect ways that magnets will react with various materials. However, appropriate assessments should also require students to *identify* ways that magnets will interact with various materials.

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2-5.4 Identify everyday uses of magnets.

Taxonomy level: 1.1-A Remember Factual Knowledge

Previous/Future knowledge: This is the first time that students have investigated everyday uses of magnets, but the concept will be further developed in 4th grade (4-5.9) with the introduction of electromagnets.

It is essential for students to know that magnets are used in our everyday lives. They are found in their homes, schools and at places where people work. Some examples of everyday uses of magnets are:

- Magnets on cranes lift heavy objects like cars in a junk yard
- Some screwdrivers have a magnetic end to hold the screw in place
- Magnets on the refrigerator hold student art work so everyone can see it
- A compass points out the direction we are traveling and the compass needle is magnetic
- The cabinet doors in our kitchen may be held shut by a magnet
- Farmers use a magnet to put in a cow's stomach to attract any metal a cow may eat. This keeps the cow from getting hurt by the metal.

It is not essential for students to be introduced to every type of magnet.

Assessment Guidelines:

The objective of this indicator is to *identify* uses of magnets in everyday life; therefore, the primary focus of assessment should be to locate magnets in our everyday life. However, appropriate assessments should also require students to *recall* ways magnets are used in everyday life; or *recognize* ways magnets are used in everyday life.